Series and parallel circuits

Name _____ Class _____ Date _____

Components can be connected **in series** (one path) or **in parallel** (separate branches). The rules for current, p.d. and resistance are different.

KEY RULES

Series
Same current through each component
Supply p.d. is shared
$R_{total} = R_1 + R_2$

Parallel
Same p.d. across each branch
Branch currents add up to the total
R_{total} is less than the smallest resistor

Section A · Recall

Grade 4–5

1 Two resistors of 4 Ω and 6 Ω are connected in series. Calculate the total resistance. [1]

2 Complete the sentences. [3]

Section B · Calculate

Grade 5–6

3 A 12 V battery is connected to a 2 Ω and a 4 Ω resistor in series.

a Calculate the total resistance. [1]

b Calculate the current. [2]

c Calculate the p.d. across each resistor. [2]

4 A 6 V battery is connected to two lamps in parallel. The currents through the branches are 0.3 A and 0.5 A.

a Calculate the current from the battery. [1]

b State the p.d. across each lamp. [1]

Section C · Stretch

Grade 7+

5 Explain why adding a second resistor in parallel reduces the total resistance of a circuit. [3]

6 Explain why the lights in a house are wired in parallel. [2]

Exam-style question

AQA style

7 A 9 V battery is connected to a 3 Ω resistor and a 6 Ω resistor in parallel.

a Calculate the current through each resistor. [3]

b Calculate the total resistance of the circuit. [2]

Total: _____ / 21

How confident am I?	Not yet	Nearly	Got it
I can state the rules for series and parallel circuits	☐	☐	☐
I can calculate currents and p.d.s in series circuits	☐	☐	☐
I can explain why parallel resistance is lower	☐	☐	☐